

**AN INTERACTIVE JAWI LEARNING TOOL FOR CHILDREN –
A PROPOSED DESIGN**

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**UNIVERSITI UTARA MALAYSIA
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**AN INTERACTIVE JAWI LEARNING TOOL FOR CHILDREN –
A PROPOSED DESIGN**

**A project submitted to Dean of Research and Postgraduate Studies Office in partial
Fulfillment of the requirement for the degree
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Universiti Utara Malaysia**

**By
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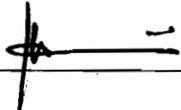
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ABSTRAK

Jawi adalah sistem tulisan Bahasa Melayu yang mengandungi huruf yang sama dengan huruf tulisan Arab. Bagaimanapun, tidak semua masyarakat boleh membaca dan mengenal huruf Jawi dengan baik. Berdasarkan masalah ini, satu aplikasi multimedia didapati boleh membantu mereka yang mengalami masalah ini terutamanya kanak-kanak untuk belajar Jawi. Kajian ini lebih focus kepada reka bentuk dan penghasilan interaktif multimedia untuk belajar Jawi yang di kenali sebagai “An Interactive Jawi Learning Tool for Children - A Proposed Design”. Aplikasi ini sangat berguna untuk kanak-kanak mempelajari dan membaca Jawi. Selain itu, aplikasi ini mengandungi Asas Huruf Jawi, suku kata terbuka dan tertutup dan juga ejaan diftong. Aplikasi ini adalah bertujuan untuk membantu kanak-kanak membaca dan menulis Jawi disamping sebagai satu platform yang sangat menarik untuk kanak-kanak belajar Jawi.

ABSTRACT

Jawi is a Malay Language writing system whose characters are similar to Arabic characters. However, not all people can read and recognize each Jawi alphabet very well. Stems from these problem, a multimedia application for learning Jawi is viewed as important in order to help people especially children, to learn Jawi. This study proposes to design and develop an interactive multimedia application for Jawi learning which is called An Interactive Jawi Learning Tool for Children – A Proposed Design. This application is useful for children to learn and read Jawi. It provides basic Jawi alphabets, open and close syllables and diphthong as well as how to write Jawi letters and words. The Jawi Learning Tool aims to help children to read and write Jawi letters and fluently, thus creating a more interesting platform to learn Jawi.

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LIST OF TABLES

| No of Table | Title | Pages |
|--------------------|--|--------------|
| Table 2.1 | The Jawi alphabets adopted from the Arabic alphabets | 11 |
| Table 2.2 | The additional Jawi alphabets | 12 |
| Table 4.2 | Children likes and dislikes about Jawi Learning Tool prototype | 46 |
| Table 4.3 | The proposed design element for Jawi Learning Tool prototype | 47 |

LIST OF FIGURES

| No of Figure | Title | Pages |
|--------------|--|-------|
| Figure 3.1 | Jawi Learning Tool development phase using prototype method | 28 |
| Figure 3.2 | Non-Linear Storyboard for Jawi learning multimedia application | 30 |
| Figure 3.3 | Introduction of Jawi Learning Tool multimedia application | 31 |
| Figure 3.4 | Introduction screen with an interactive start button | 31 |
| Figure 3.5 | Second screen for Main menu of multimedia application | 32 |
| Figure 3.6 | “Kenal Huruf” screen displayed for “alif” | 32 |
| Figure 3.7 | “Kenal Huruf” screen displayed for “ba” | 33 |
| Figure 3.8 | “Kenal Huruf” screen displayed for “ta” | 33 |
| Figure 3.9 | “Kenal Huruf” screen displayed for “tsa” | 33 |
| Figure 3.10 | “Kenal Huruf” screen displayed for “jim” | 34 |
| Figure 3.11 | Second screen for Main menu of multimedia application | 34 |
| Figure 3.12 | Shape in different position for “ba”, “ta”, “tsa”, and “nya” alphabets | 35 |
| Figure 3.13 | Jawi and malay words for each different position for “ba” alphabets | 35 |
| Figure 3.14 | Shape in different position for “jim”, “hha”, “kha”, and “ca” alphabets | 35 |
| Figure 3.15 | Shape in different position for “dal”, “dzal”, “ra”, and “zai” alphabets | 36 |
| Figure 3.16 | Shape in different position for “sin”, and “syin” alphabets | 36 |
| Figure 3.17 | Shape in different position for “ain”, “ghain”, and “nga” alphabets | 36 |
| Figure 3.18 | List of menu that use vertical bar | 40 |
| Figure 3.19 | Forward and backward button as navigation | 40 |

TABLE OF CONTENTS

| | Page |
|--|------|
| PERMISSION TO USE | I |
| ABSTRACT (BAHASA MALAYSIA) | II |
| ABSTRACT (ENGLISH) | III |
| ACKNOWLEDGMENTS | IV |
| LIST OF TABLE | V |
| LIST OF FIGURES | VI |
| CHAPTER ONE: INTRODUCTION | |
| 1.1 The context of the study | 1 |
| 1.2 Statement of the problem | 1 |
| 1.2.1 Research Question | 1 |
| 1.3 The goals and objectives of the study | |
| 1.3.1 Goals | 2 |
| 1.3.2 Specific objectives | 3 |
| 1.4 Significance of the study | 3 |
| 1.5 Scope, assumptions, and limitations of the study | |
| 1.5.1 Scope of the study | 4 |
| 1.5.2 Assumptions of the study | 4 |
| 1.5.3 Limitations of the study | 5 |
| 1.6 Definition of terms | 6 |
| 1.7 Organization of the report | 6 |
| CHAPTER TWO: LITERATURE REVIEW | |
| 2.1 Introduction | 8 |
| 2.2 Jawi Background | 9 |
| 2.3 Interactive Multimedia | 14 |
| 2.4 Multimedia Development | 16 |
| 2.5 Multimedia Evaluation using Usability Testing | 20 |
| 2.6 Summary | 23 |

| | |
|--|----|
| CHAPTER THREE: RESEARCH METHODOLOGY | |
| 3.1 Introduction | 26 |
| 3.2 Data Collection | 26 |
| 3.3 Rapid Application Development | 27 |
| 3.3.1 Initial Investigation | 28 |
| 3.3.2 Requirement Definition | 29 |
| 3.3.3 Prototype Design | 30 |
| 3.3.4 Modification | 37 |
| 3.3.5 Assessment | 37 |
| 3.3.6 Prototype Refinement | 38 |
| 3.3.7 Implementation | 38 |
| 3.4 Usability Testing | 38 |
| 3.4.1 Ease and Effectiveness of Navigation | 39 |
| 3.4.2 Usefulness of Content | 41 |
| 3.4.3 Effectiveness of Presentation | 41 |
| 3.4.4 Task Success Rate | 41 |
| 3.5 Summary | 42 |
| CHAPTER FOUR: RESULT | |
| 4.1 Introduction | 43 |
| 4.2 Result | 44 |
| 4.2.1 Ease and Effectiveness of Navigation | 44 |
| 4.2.2 Usefulness of Content | 45 |
| 4.2.3 Effectiveness of Presentation | 45 |
| 4.3 Analysis and Discussion | 45 |
| 4.4 Summary | 47 |
| CHAPTER FIVE: CONCLUSION | |
| 5.1 Research Conclusion | 48 |
| 5.2 Future Directions | 49 |
| | |
| References | |
| | |
| Appendix A | |

CHAPTER ONE

INTRODUCTION

1.1 The Context of The Study

A Jawi Learning Tool is an interactive application multimedia for Jawi reading. This project is about designing and developing an interactive application that allows users to listen and read Jawi words. The Jawi Learning Tool shall contain audio and text. The text element shall cater two languages, which are Rumi words and Jawi words. Before starting the application, user has the option of either reading or to start from the basic learning of Jawi. The basic learning here means that user can recognize basic Jawi letters from “Aliff” to “Ya”. The Jawi Learning Tool is a promising method to ease learning as it provides with audio feedback.

1.2 Statement of the Problem

Nowadays, most people are unable to read and write Jawi very well (Nik Rosila, 2007). There are lots of factors that contribute to this problem. Some of the factors that have been identified are family background which careless about Islamic Education and less and less interest to learn more about Jawi. It’s start from children

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References

- Amat Juhari Moain, *Perancangan Bahasa: Sejarah Aksara Jawi*. Kuala Lumpur: Dewan Bahasa dan Pustaka, 1996.
- Brinkman, W.P., Haakma, R., & Bouwhuis, D.G. (2008). *Component-Specific Usability Testing*. Retrieve December 29, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=4604822>
- Centers for Medicare & Medicaid Services. *Selecting a Development Approach* (2008). Retrieve November 24, 2010 from <https://www.cms.gov/SystemLifecycleFramework/Downloads/SelectingDevelopmentApproach.pdf>
- Chiasson, S. & Gutwin, C. (2005). *Design Principles for Children's Technology*. Department of Computer Science, University of Saskatchewan. Retrieve December 6, 2010 from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.83.5281&rep=rep1&type=pdf>
- Daphne, E., William, M.L., Steve, P.R. & Andrian, W.J. (2000). *CVE technology development based on real world application and user needs*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=883698>
- Developing Instructional Multimedia, A Realistick Look. Retrieve November 24, 2010 from <http://www.uic.edu/depts/accc/newsletter/adn06/realistic.html>
- Duh, M. & Krasna, M. (2010). *Interactive e-learning materials: How to prepare and use it properly*. Retrieve December 8, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=5533536>
- England, E., & Finney, A. (2002). *Interactive Media- what's that? Who's involved?*. Retrieve December 12, 2010 from http://www.atsf.co.uk/atsf/interactive_media.pdf
- EunJung Han, HwangKyu Yang & Keechul Jung. (2007). *Mobile Education through Camera-Equipped Mobile Phones*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=4420491>
- Evangelista, C., Neri, V., Carrozzino, M. & Bergamasco, M. (2009). *Interactive Storytelling for Children Education*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=5116575>
- Fai, K.L., Allan, H.K.Y., & Lian, J.M-G. (2006). *Adapted Multimedia Design for Language Learning in children with autism*. Retrieve December 6, 2010 from <http://www.formatex.org/micte2006/pdf/1081-1085.pdf>
- Huilian, N., & Zhijiang, Y. (2010). *The Application of Educational Game in teaching the Young Children to Read Musical Notation*. Retrieve December 8, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=5641496>

- Inkpen, K.M.(2001). *Drag-and-Drop versus Point-and-Click Mouse Interaction Style for Children*. Retrieve December 11, 2010 from <http://delivery.acm.org/10.1145/380000/371146/p1-inkpen.pdf?key1=371146&key2=6005402921&coll=DL&dl=ACM&CFID=1520719&CFTOKEN=61185559>
- Interactive. Retrieve January 3, 2011 from <http://www.syberworks.com/glossary/i/i1.htm>
- ISO 9241-11 , Ergonomic requirements for office work with visual display terminals (VDTs) – Part 11: Guidance on usability. 1998.
- Nielsen's, J. (2000). *Why You Only Need to Test with 5 users*. Retrieved February 5, 2011 from <http://www.useit.com/alertbox/20000319.html>
- Nielsen's, J. (1993). *Usability Engineering*, Morgan Kaufmann Publishers Inc., San Francisco, CA.
- Kuutti, K., Battarbee, K., Sade, S., Mattelmaki, T., Keinonen, T., Teirikko, T., & Tornberg, A.M. *Virtual Prototypes in Usability Testing* (2001). Retrieve December 29, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=926545>
- MacFarlane, S., Sim, G., & Horton, M. (2005). *Assessing Usability and Fun in Educational Software*. Retrieve December 6, 2010 from <http://www2.tech.purdue.edu/cgt/courses/cgt512/articles/usability%20and%20fun%20in%20educational%20software.pdf>
- Markopoulos, P. & Bekker, M. (2003). *On Assessment of Usability Testing Methods for children*. Retrieve December 6, 2010 from http://www.sciencedirect.com/science?_ob=MIimg&_imagekey=B6V0D-48D3G87-2-8&_cdi=5644&_user=977016&_pii=S0953543803000092&_origin=search&_coverDate=04%2F30%2F2003&_sk=999849997&view=c&wchp=dGLbVlb-zSkzV&md5=f92810983b19f2b1140acb0613631c40&ie=/sdarticle.pdf
- Mazzone, E., Xu, D., & Read, J.C. (2007). *Design in Evaluation: Reflection on Designing for Children's Technology*. Retrieve December 6, 2010 from http://www.chici.org/references/design_in_evaluation.pdf
- Merriam Webster Dictionary- *Interactive*. Retrieve December 12, 2010 from <http://www.merriam-webster.com/dictionary/interactive?show=0&t=1292471713>
- Michalas, A., Zoi, V., Sotiropoulos, N., Mitrou, N., Loumos, N., & Kayafas, E. (2000). *A comparison of two object oriented application development platforms for multimedia services to the internet*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=880042>
- Mohammad Faidzul Nashrudin, Petrou, M., & Kotoulas, L(2010). *Jawi Character Recognition using the Trace Transform*. Retrieve November 24, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=5576210>

- Mohd Faidzul Nasharudin, Khairuddin Omar, Mohamad Shanudin Zakaria, & Liong C. Y. (2008). *Handwritten Cursive Jawi Character Recognition : A Survey*. Retrieve November 24, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=4627015&tag=1>
- Morozov, M., & Markov, A. (2000). *How to Make Courseware for Schools Interesting: New Metaphors in Educational Multimedia*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=890612>
- Najjar, L. J. (1998). *Principle Of Educational Multimedia User Interface Design. Principles of Educational Multimedia User Interface Design*. Human Factors, 40(2), 311-323. Retrieve November 27, 2010 from <http://ddi.cs.uni-potsdam.de/HyFISCH/Multimedia/Learning/MMDesignNajjar.htm>
- Narayanan, S. & Potamianos, A. (2002). *Creating Conversational Interface for Children*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=985544>
- Nik Marsyahariani Nik Daud., Nor Azila Awang Abu Bakar, & Hazlifah Mohd Rusli (2010). *Implementing rapid application development (RAD) methodology in developing practical training application system*. Retrieve December 12, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=5561634>
- Nik Rosila Nik Yaacob. (2007). *Penguasaan Jawi dan Hubungannya dengan Minat dan Pencapaian Pelajar dalam Pendidikan Islam*. Retrieve November 29, 2010 from [http://web.usm.my/education/publication/JPP%20Nik%20Rosila%20ART%2010%20\(161-172\).pdf](http://web.usm.my/education/publication/JPP%20Nik%20Rosila%20ART%2010%20(161-172).pdf)
- Norizan Mat Diah, Marina Ismail, Suzana Ahmad, & Mohd Khairulnizam Md Dahari. (2010). *Usability Testing for Educational Computer Game using Observation Method*. Retrieve December 6, 2010 from <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=05466926>
- Normahdiah Sheik Said (2004). *An Experimental Study to develop an Engaging Multimedia Design Model for Children*. University Putra Malaysia. Retrieve November 27, 2010 from [http://psasir.upm.edu.my/6604/1/TLN_2004_9\(1-24\).pdf](http://psasir.upm.edu.my/6604/1/TLN_2004_9(1-24).pdf)
- Omar Awang. *The Terengganu Inscription As The Earliest Known Evidence of The Finalisation of The Jawi Alphabet*, Islamika, vol. 111, Jabatan Pengajian Islam, Universiti Malaya, 189, 1985.
- Oosterholt, R., Kusano, M., & Vries, G.D. (1996). *Interaction Design and Human Factors support in the Development of Personal Communicator for Children*. Retrieve December 11, 2010 from <http://www.waterlander.com/images/p450-oosterholt.pdf>

- Raisamo, R., Hippula, A., Patomaki, S., Tuominen, E., Pasto, V., & Hasu, M. (2006). *Testing Usability of Multimodal Application with visually Impaired Children*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=1667979>
- Read, J., Gregory, P., MacFarlane, S., McManus, B., Gray, & Patel, R. (2002). *An Investigation of Participatory Design with Children- Informant, Balanced and Facilitated design*. Retrieve December 11, 2010 from 10.1.1.109.1324.pdf
- Read, J.C., MacFarlane, S., & Gregory, P. (2004). *Requirement for the Design of Handwriting recognition Based Writing Interface for Children*. Retrieve December 11, 2010 from http://delivery.acm.org/10.1145/1020000/1017844/p81-read.pdf?key1=1017844&key2=1047402921&coll=DL&dl=ACM&CFID=1520719&CF_TOKEN=61185559
- Redika, R., Omar, K., & Nasrudin, M.F. (2008) *Handwritten Jawi Words Recognition using Hidden Markov Models*. Retrieve November 24, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=4631723>
- Roslan Abdul Ghani, Mohamad Shanudin Zakaria, & Khairuddin Omar. (2009). *Jawi-Malay Transliteration*. Retrieve November 24, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=5072010>
- Russell, M., Brown, C., Skilling, A., Series, R., Wallace, J., Bonham, B. & Barker, P. (1996). *Application of Automatic Speech Recognition to Speech and Language Development in Young Children*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=607069&tag=1>
- Sanjaya Mishra, & Ramesh C.Sharma. (2004). *Interactive Multimedia in Education and Training*. Retrieve December 12, 2010 from <http://tojde.anadolu.edu.tr/tojde17/pdf/intmultimedia.pdf>
- Schank, R.C.(1994). *Active Learning through Multimedia*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=295270>
- Sedighian, K., & Klawe, M.M. (1996). *An Interface Strategy for Promoting Reflective Cognition in Children*. Retrieve December 11, 2010 from <http://delivery.acm.org/10.1145/260000/257244/p177-sedighian.pdf?key1=257244&key2=4994402921&coll=DL&dl=ACM&CFID=1520719&CFTOKEN=61185559>
- Sherwood, C. & Rout, T. (1998) *A structured Methodology for Multimedia Product and Systems Development*. Retrieve November 24, 2010 from <http://www.ascilite.org.au/conferences/wollongong98/asc98-pdf/sherwood0141.pdf>

- Siew, P.H. & Norhayati Abdul Mukti. (2004). *Citra : Interactive Multimedia Package in Moral education for Primary School*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=1414577>
- Siti Zawiah Ab Aziz. (2010). *Perkembangan Tulisan Jawi dalam Masyarakat Melayu*. Retrieve November 24, 2010 from <http://ptjimatmie.webs.com/>
- Sugimoto Masanori. (2007). *What can Children Learn through Game-based Learning System?* Retrieve December 8, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=4148825&tag=1>
- Suzana Baharudin, Marina Ismail, Ismassabah Ismail, & Suhana M.Nasir, (2010). *STAR: Story telling for Arabic Language*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=5466931>
- SyberWorks Learning and Performance Glossary- *Interactive Multimedia*. Retrieve December 12, 2010 from <http://www.syberworks.com/glossary/i/i1.htm>
- The Universiti of Texas at Austin. *Usability Testing* (2007). Retrieve December 1, 2010 from <http://www.utexas.edu/learn/usability/index.html>
- Wan Fatimah Wan Ahmad, Emelia Akashah P. Akhir, & Sarah Azmee. (2010). *Game-based Learning Courseware for children with Learning Disabilities*. Retrieve December 8, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=5561303>
- Zaidi, R, Rosli, S & Mashkuri, Y. (2005). *Hardware Design of On-Line jawi Character Recognition Chip using Discrete Wavelet Transform*. Retrieve November 24, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=1575516>
- Zaqaibeh, B., Al-Qdah, M., Ibrahim, H. & Taysir, M. (2003). *A Special Library for Supporting Jawi Fonts in BGI Mode*. Retrieve November 24, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=1459682>
- Zurina Muda, & Izam Shah Basiron. (2005). *Multimedia Adventure Games as Edutainment Application*. Retrieve December 5, 2010 from <http://ieeexplore.ieee.org.eserv.uum.edu.my/stamp/stamp.jsp?tp=&arnumber=1631517>